A Dravidian decipherment of Indus script

S.K.Venkatesan

CQRL Bits, Chennai

Abstract

The Indus script writing system is described here as a logo-syllabic system with almost unique syllables associated with them. The crucial aspect of the decipherment is the observation that semantic value of numbers are not related to quantifiers but are used as adjectives such first/strong/mature etc., through the syllables that are derived out of it. The standalone semantic values of the logo have crucial role to play in deciding the syllabic value of the logo, but it only uses the modified syllabic value in the instances of the text. Although main syllabic value is maintained around it's primary consonant value, the syllables have pluripotency both in terms of semantics and syllables in context, i.e., they have modified vowels and soft consonants (glides).

This decipherment is not only about syllabary, it also provides complete semantic decipherment as well, uncovering various aspects of the life of Indus Valley Civilization. Most of the seals are about the barter trade transactions and describe from/to addresses, with mode-of-transport indicated in-between. The urn-symbol is deciphered as "ūr" (town/village) with various adjectives preceding it (or infused into the sign) describing the town. The unicorn-seal indicates that it is trade-related activity. The fish-signs and arrow signs describe the mode of transport of goods. The goods are indicated by the object before the animal indicating whether it is a food-type or not (perishable goods or not). The decipherment also uncovers aspects other than trade, like marriage and disputes.

Prelims

We list a few acronyms/initialisms that is commonly used in the article:

IVC : Indus Valley Civilization
DED: Dravidian Etymology Dictionary [1]
M77: MASI 77, Mahadevan [2]
WB: Wells, B., Indus Writing [3]
MVB: M.V.Bhaskar [4]

DED refers to the entry numbers in Dravidian Etymology Dictionary [1]. Here we use M77 to denote Mahadevan's sign numbers [2], but the glyphs in this paper were created using Asko Parbola's NFM Indus Script font. Mahadevan has simplified and reduced the number of signs, by considering many of them as variants of the same theme or treating them as identical. For a richer source of symbols and data, please refer to Wells [3] or the character list in NFM Indus Script font.

Introduction

Indus valley civilization was contemporary to other civilizations such as the Mesopotomia and Egyptian civilizations with it's own independent system of writing. Each of these systems had their

own culture and languages that were unique to their own civilization. It is a great challenge to decipher any one of them without a multilingual Rosetta stone, but such decipherments have been successfully achieved in the case of Linear Elamite [5]. In the case of Indus script it has been well established, through various indirect attempts, that it is closely related in cultural aspects with the ancient Dravidian culture and language. However, broad confusion arises when attempts are made to relate it to an alphabetic system as it seems similar to a complex logo-syllabic system like the Egyptian system of writing. There have been many futile attempts to conjure-up such a relation between the Tamil Brahmi writing system and the Indus script, despite of the fact that the Indus signs have strong pictorial content.

It took a while for the modern alphabets to arrive (around 1000 BCE) and one can expect that the logo-syllabic system of Indus script, like the earlier versions of Egyptian writing system, to be pre-alphabetic/abugida stage, where pure consonants have not yet been crystalized and extracted out of the spoken languages. From this decipherment it seems that the atomic units (signs) of the IVC writing system are logo-syllables, with the high potential for creating homophones, thus reducing the number of signs required for the orchestration of the writing system within the specific context of IVC society and it's trade transactions.

In this decipherment, the author followed the trail left by these signs (like a detective), as it uncovers through internal evidences tracing them one by one. Sometimes serendipity plays a big role in our findings, and all this would not have been possible but for the enormous sign lists and concordance data that has been gathered painstakingly by many reserachers over very many decades, making them freely accessible online. Of course, it also helps if your mother tongue has roots to the very same language and culture, although displaced in time by more than 5000 years!

In the next section we first outline the syllabary of Indus script as it is preceived here. Detailed list of all symbols and their syllabic values are described in a later section on "Syllabic development". After the next section on orthography we briefly describe the skilled artistry of Indus writing system, then the crucial role of Numbers, Clitics and the system of "Learning through pun". In the section after "Syllabic development" we describe a few frequent phrases that emerge out of the corpus with two or three logos. We then classify a few logos under functional ideographic categories (although they are primarily syllables they also have certain ideographic tendencies). Next we outline the crucial aspects of fish signs and their various manifestations. In the section after this we briefly sketch the dominant trade activities and their relative importance and it's implications in the development of a class society. We then go on to decipher several lines of text in the corpus and also seals containing interesting graphical content with their corresponding text in a "Show and tell" section. We end the body of the article with sections about "Overlap with previous work" and "Acknowledgements".

Orthography of the Indus script

The logo-syllabic syllabary of Indus will be described here as it is preceived here in use. We try to discern if there are broad rules of orthography in this writing system that we can observe. We will start with some simple number systems and see how they can prefix or suffix to other symbols/syllables in the system.

To begin with we use a simple rule that there is one and only one syllable to which each of these signs get assigned to. This is a simple rule to follow and it can be easily be discerned if it breaks. We will now describe the other patterns or rules that we observe.

80 Let us now consider the M77 sign-373 ○ to which we assign the syllable "pa" (from "pakal", meaning the sun or daylight). For the sign-86 │ we assume that it has the value "mutal" (the primary one) and then see how it applies to the sign-375 ◌̇. We believe that this value is indicated by the sign-376 ◌̑ that has a tooth attached to it. So we have:

`pa + mut-al = pal`

85

Now let us consider the sign-391 ⊕, a sign that we know has strong correlations with elephant seals from MVB [4] findings, so we assign the value "palla" that also has close proximity to "pal", but we can see there are three cross-lines and/or six small pieces, making it more like "pillir". There is also another possibility that this is decided by DED 1045 ōṭai/ōṭa, a metal badge that is
90 applied to the forehead of the elephant. So we observe that although broad rules are applied, there are also *ideosyncracies* of local culture that also provide a few interesting twists and turns, but in general it tries to confirm to some broad outlines.

We will now move to the interesting sign-287), which we have assigned the value "valai/vaḷai" after looking at it's close cousins sign-298 ⫻⫻ and sign-290 ⨍ that has five
95 strokes affixed to it's top-right.

`⫻⫻ = ⨍ = ) + ||||| = vala + ai = valai`

Doubling on that we get,

`⫻⫻ = valai + ||||| = valai + ai = valaianjih or valaicci or valayacci`

If sign-290 has three strokes on top we can get,

100 `⨍ = valai + ||| = vaḷai + mu = vaḷaiyam`

Semantically "vala/vaḷa" is "right/curved" as the symbol right parenthesis and when combined with "5" (ai) it becomes valai.

We also observed for M77 sign-62 ⨎ that we can assign value "vālai" (scabbard fish that has sharp teeth). The sign-295 ⨍ "iru-valai" sounds similar to "ēri-vāḷai". These signs also
105 indicate that such deformation of the base syllable is possible, i.e., "valai" ≈ "vālai" and "ēri" ≈ "iru". Of course, high homophony is one of the crucial principles in creating a script with minimal number of signs.

Next, we look at sign-81 ⨎ that we assign the value "valai-puri", while we assign sign-63 ⨎ the value "kanni-pori" (DED 1183, 4538, 4603). This then decides "kanni" for fish-sign and
110 "puri" ≈ "pori" for bird (quail) sign.

Based on these successes we decide to take a look on the other variants of fish-sign. For sign-70 ⨎ we apply "kāl" (DED 1483 assigns the semantic value of "cart") and for sign-72 ⨎ "kōl" (DED 2238 assigns a semantic value of "raft/float"). One might ask why not assign the values the other way around, but the important clue comes from the cross-line that looks more like paddle/oar. Yes,
115 again there are some *ideosyncracies* that comes with it.

We now move to sign-328 ⋃ for which we asign the value "ū/u/va". So for the sign-332:

⋇ = ⋃ + ⦀⦀ = va + ai = vai

Similarly we also get the very important sign-342:

Ʊ̆ = ⋃ + ‖ = ū + iru = ūr

120   Next, we get on to double affix, sign-336 ⋓̆:

⋓̆ = ⋃ + | + ∘̈ = u + mu-ta-l + n̠ = uṭan̠ (DED 945)

Here sign-374 ∘̈ takes the value "n̠" (from droplet, "nīr") and sign-336 ⋓̆ (uṭan̠) has the ideographic association with mortar & pestle (a marriage ritual association as well)! In the M77 concordance list the sign-321 ⋒ is immediately preceded by sign-336 ⋓̆. As the two sign-374 ∘̈ are
125   joined together by a string, a value of "ñān̠" (DED 2908 "string") will be the correct one:

⋒⋓̆ = uṭan̠ + ñān̠ = uṭan̠-ñān̠ (marriage agreement)

Although the picture speaks thousand words there are also hints of syllables through micro-typography in Indus script. Consider sign-402:

⊢ = ∘̈ + | = na + ṭu = naṭu

130   ⋀ = ⦀⦀ + ⊢ = nāl + naṭu = nāṭu

φ = | + ∘̈ = mutal + ni = maṇi

φ = ∘̈ + | = ni + mutal = aṇiyal

and now let us consider another sign-51:

⚘ = ⦀⦀ + ‖ + ⚲ = mu + iru + an = māran

135   with an additional twist as "māran" twists and looks back (a feature observed by Mahadevan and passed-on through personal communications by MVB).

Of course, we can also say as additional double-emphasis things like:

iruvaṟi-māṟan-kuṟumpu

(true-path māṟan chief)

140   Now on to another topic:

M77 No.	Glyph	Roman	Tamil
169	⅄̊	nilam	நிலம்
171	ⵯ	nilai	நிலை
174	ⵯ	iru-nēla	இருநெல்
88	⦙⦀	nal-iru	நல்-இரு

These are characters that seems to stand-out (pun intended with "nil" being DED 3675 "to stand"), i.e., decided more by the context of IVC barter transactions and not by any complex orthography rules.

145 So as a broad outline we can say that the signs in IVC script are strongly associated with unique syllables and that the IVC writing system allows plenty of ways to mutate them in many ways from their base ideographic glyph values. However, it is not clear that in the case when there are multiple affixes applied, then which comes first, i.e., whether a base glyph applies first etc. In general one could assume it flows from right-to-left and top-to-bottom, but I suppose there are many exceptions

150 that are decided by the context.

For example the famous sign-116 ⸽⸽⸽ can take the value "nellai/nallai" but the other-way around can also be "ayal" is quite unlikely in the IVC transaction context. Sign-112 ⸽⸽ works as "munnāl" but in the semantics of IVC transactions "ñālam" works better. Of course, both are possible and even within the context of IVC "munnāl" might be a better choice in some particular

155 case.

The non-affixed pure IVC signs have unique syllables associated with them, which have either single consonant and two consonants at the most. The combining rules usually seem to drop the middle consonants, and of course the vowels are modified as pertinent to the situation.

In some cases the components may not be a disjoint merger but a continuous merger (welding) of

160 the two as in this case:

⋈ = ✕ + ⟩
taṟi = tan + vaṟi

Finally as an interesting remark I would like to bring to attention a nice little sign-310 ⱱ with a probable value of "vilavila" (DED 5424)

165 ⱱ = ⟩ + ⟩ = vil + vil = vilavila

that sounds similar to "vavvāl" (long-tailed fruit bat?) as used in this line of text:

ⱱ ⊡ ⱱ ✻ ⋈◁◁

Trembling with fear "vilavila" congnates well with "eerie bat", so we try to decipher this line.

Vilamban trembling with fear "loading" (māṭṭu, ⊡) the bow, but what's to the right of

170 vilamban, a tiger? Tiger trembling or the hunter trembling? So we notice that it could be:

ciṟuttai = cīpu + iru-tai = ⋈ + ◁ (right-to-left) = ⋈◁◁

This describes the process of discovery through an example. As a broader generalization we could insist for Dravidian decipherment that the following triangle commute (i.e., more like walking on three legs or squash on three walls):

175

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180
```
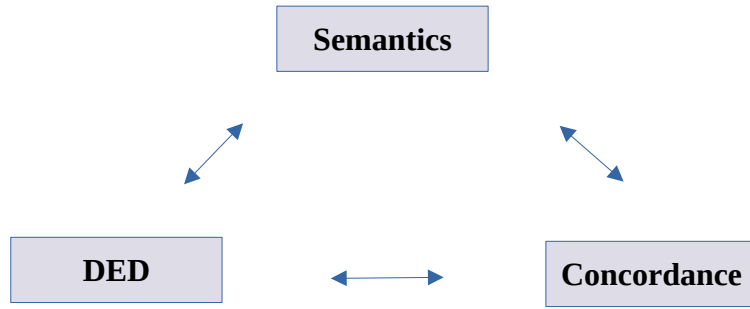
We illustrate this with a line of text:


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185   valan.ai-iru.valai-varvan.ūr-anjih
```

To fit it into the context we need to modify this to:

```
valamai-iru.vilai-vuṟavan.ūr-anjih
```
வளமை இருவிளை உழவனூர் வஞ்சி

Semantics:

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190
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Fertile highly productive farmer's town paddy
or
Fertile double-crop farmer's town paddy

We now show how consonants and vowels express themselves in this system, but since it is not an alphabetic system, they don't carry any special importance by themselves as there are many more

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195
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syllables with single and double consonants that are used to complete the langauge.

Consonants and their signs

Consonant	M77 sign	Glyph	Roman	Tamil
ka (க)	59	⚘	kaṇni	கன்னி
ce (சே)	76	🐓	cēval	சேவல்
ta (த)	216	⋈	tanṭi	தண்டி
pa (ப)	373	○	pakal	பகல்
pu (பு)	78	⚲	pūr	பூர்
pū (பூ)	54	⚶	pū	பூ
ma (ம)	242	⊞	māṭi, māṭu	மாடி, மாடு
mē (மே)	197	⌂	mēl	மேல்
mu (மு)	86	ǀ	mu	மு, முதல்
mū (மூ)	89	⦀	mū	மூ, மூணு
na (ன)	374	∴	na	ன
nā (நா)	95	⦀⦀	nāl	நால்
r (ர)	87	‖	ranṭu	ரண்டு
va (வ)	328	∪	va	வ

Consonant	M77 sign	Glyph	Roman	Tamil
ṛa (ழ)	400	⚹	ṛa	நுழ
ṛu (ழு)	110	⦀⦀⦀	ṛu	மு

Although vowels and glides can be arbitrarily mutated, modified or introduced in to the system while combining with the base syllable, the vowels are very much required at the beginning of a word. We list a few here.

Vowels and their signs

Vowel	M77 sign	Glyph	Roman	Tamil
an (அ)	1	大	an	-அன்
āṭu (ஆ)	50	🐄	āṭu	ஆத்து, ஆடு
ila (இ)	323	♤	ila	இல
ūr (ஊ)	342	℧	ūr	ஊர்
eṛu (எ)	110	⦀⦀⦀⦀	eṛu	ஏழு

Skilled artistry of Indus script

At the core of Indus script lies the mastery of a skilled metallurgist (🐄). We will illustrate this with these with few examples:

$$℧⚹Ψ = ℧⚹ϟΨ = \text{vēl-aṇi-nuṛan-ūr} = \text{வேல்அணிநுழனூர்}$$

The semantic meaning being the town with tailors, jewellery and hunting professions.

$$⚡ = | \wedge ⌂ ‖ ‖‖ = \text{mu-iru-mēl-pēr-ul} = \text{மூவிரு மேல்பொருள்}$$

In this case the semantic meaning could be the mighty great guardian of the township (elevated to kings and gods at later times).

Some important townships

This is just indicative of the various kinds of townships and professions, and a deeper quantitaive study is required to obtain their relative importance. What is interesting is that the last one in the list is farmer's town, which doesn't count really as a town, but in Dravidian languages, the term "ūr" seems to cover what we call "village" also. Here we use M77 to denote Mahadevan's sign numbers [2], but the glyphs in this paper were created using Asko Parbola's NFM Indus Script font. DED refers to the entry numbers in Dravidian Etymology Dictionary [1]. For a richer source of symbols and data, please refer to Wells [3]. Some of these signs here have been identified earlier by other authors, so a proper acknowledgment of these facts will be added later on in a separate section.

M77 Sign	Glyph	Syllable	DED	Description	Tamil
342	℧	ūr	752	town	ஊர்

M77 Sign	Glyph	Syllable	DED	Description	Tamil
347	᎔᎔	velūr	-	hunter's town	வேலூர்
358	᎔᎔	chevūr	-	bronze worker town	செவ்வூர்
351	᎔᎔	vel-nuṟan-ūr	-	hunter-cloth worker town	வேல்நுழவூர்
?	᎔᎔	che-palla-ūr	-	bronze-elephant worker town	செவப்பல்லூர்
355	᎔᎔	vel-palla-ūr	-	hunter-elephant worker town	வேல்பல்லூர்
361	᎔᎔	che-ko-ūr	-	herder-bronze worker town	செங்கோவூர்
372	᎔᎔	vel-aṇi-nuṟan-ūr	-	hunter-jeweller-tailor town	வேல்அணிநுழநூர்
15	𝍖	uṟavūr	688	working, farming town	உழவூர்

Numbers

215 Numbers are treated separately, but they are just like other glyphs, easily welded and affixed to other glyphs, producing a plethora of possibilities. However, they are an important pointer to the fact that the actual standlone semantic value (in this case the numeric number) of the glyphs may have very little to do with it's semantic value.

M77 Sign	Glyph	Syllable	DED	Description	Tamil
86	❘	mutal, -al	4950	one, primary	முதல், -ல்
87	❙	-ar, -ir, iru-	474, 481	big, great, eminent, two	ரண்டு, -இர், -ர், இரு-
89	❚	mū-, mūn-	5052	mature, three	மூ-, மூன்-
95	❘❘❘❘	nal-, -nāl, nalla-	2912	good, four	நல்-, -நால், நல்ல-
96	❘❘❘❘❘	-ai	2826	unite, five	-ஐ
108	❘❘❘❘❘❘	aru-, -ar	2485	river, fort, six	ஆறு, அறு-
110	❘❘❘❘❘❘❘	eṟu-, -eṟu	910	rise, fertile, seven	ஏழு, -எழு
	Application of above phonemes				
112	᠁	nalam, ñālam, munnāl	2913	land, healthy, before	நலம், நாலம், முன்னால்
116	᠁	nallai, nellai	-	rice	நல்லை, நெல்லை
121	᠁	nal.nel.āl	-	good rice person	நல்நெல்லாள்
120	⦚⦚⦚	mū-munamum	-	three generations back	மும்முன்னோனும், மும்முன்னமும்
119	⦚⦚	mū-munnor	-	two generations	மும்முன்னோர்

M77 Sign	Glyph	Syllable	DED	Description	Tamil
				back	
107	⁝⁝⁝	mūri, mūrā	5041	bullock, buffalo	மூரி, மூரா
177	‡	nal-mutal, nalāl	-	good chief, good worker, hard worker	நல்முதல்-, நல்லாள்

Clitics

Clitics provide sentence structure (the subject and the object). The default reading order is right to left, but before the clitic ⁝ (sign 99), the reading is supposed to be left to right (but this doesn't seem to be followed strictly by writers of IVC script).

M77 No.	Glyph	Syllable	Tamil
97	⁝	-il, -da, -ta, -in	-ட, -டு, -த, -து, -இல், -இன்
99	⁝⁝	-ra, -ru	-ர, -ரு, -ற, -று
123	〕	-yar, -yin	-யர், -யார்
344	Ʊ͟	ūr-ār	ஊரார்
343	Ʊ	ūr-il	ஊரில்

The Indus writing is not without it's own inaccuracies, either by themselves or captured by mistake by the scribes. We noticed a few cases where the clitic sign-99 ⁝⁝ has been captured as sign-87 ‖, which in those particular instances seem more like a case of sign-99 rather than sign-87. However, it must be mentioned that there are very few mistakes in the Mahadevan's corpus (both in intent and purpose), which has done a nice balancing act between variety and simplicity, thus making it easier for decipherment. For a slightly different opinion from Mahadevan on the list of signs is Wells [3]. We follow Mahadevan's sign list and numbers here, but it must be possible to do it using Wells [3] list of signs and sign-number as well without any loss of generality.

Learn through pun

Following are an indication of the pun that abounds in Indus script, which is termed as the "rebus principle". Of course, it only makes sense if your language is close to ancient Dravidian. For deeper understanding you may have to refer to some of the sign values below this in the section on "Syllabic development". We only sketch a few, but the Indus script syllabary abounds in such pun. The reduction of number of glyphs required for a writing system for Dravidian language is very much dependent on prudently choosing glyphs that provide highest possible homophony.

M77 Sign	Glyph	Syllable	DED	Description	Tamil
298	�	valai = vala+ai	5267, 5288	) = vala+5	வல+ஐ=வலை
	Right-parenthesis is "vala" (curved as well as right) in Tamil and "vala" + "ai" = "valai". "vala" is curve, as well as "right", which fits well with description of right parenthesis. Also, 〈〈〈〈 can be further expanded as "valaicci" or "valayacci" or "valayanjih".				
62	⟨ᚷ⟩	valai-kanni	5379	scabbard fish	வாளை கன்னி

M77 Sign	Glyph	Syllable	DED	Description	Tamil
				with fang-like teeth	(மீன்)
The fish "vālai" is known as the scabbard fish that has sharp teeth. A nice tooth is drawn at the top to elucidate the learning. This explains that the right-parenthesis sign-287 carry the phonetic value "valai"
295	)Ƴ	eri-valai	902	Another sharp tooth fish	ஏரி வாளை (மீன்)
A fresh water shark, <u>Wallago attu</u>, also known "eri-valai", a pun again on the word with rebus equation: "vālai" ≈ "valai". The prefix "eri" comes from "two" or "iru", leading to one more rebus equation: "iru" ≈ "eri".
63	(ᵻᚷ)	kanni-pori-valai	-	Trapping of birds	கன்னி-பொறி-வலை
This learning tablet defines the phonetic value of fish as "kanni" and the bird as "puri" by defining it through a polysyllabic pun as "kanni-pori" with a parenthetic "valai" . The "kanni-pori" in Tamil is "trapping".
64	"(ᚷᚷ)	valai-kanni	-	The clitic reverses reading order	கன்னி-பொறி-வலை
The clitic sign 64 reverses the reading order to the right of it. This learning script defines that.
376	Ơ	pal	-	teeth	பல்லு
A teeth is indicated by the protruding teeth effect, just like in the fish teeth.
57	ᚄ	irumpu	486	iron	இரும்பு
Now we have triple pun: iru-pu (two insects) ≈ erumpu (ant) ≈ irumpu (iron)
181	⫛	kottu	2065, 2064	pour (sting)	கொட்டு
We can see pincler claws are indicated to show "sting" and "pour" are homophones in Dravidian "kottu". The stinging honey-bee also is supposed elucidate connotations of "honey" that pours (kottu) from the beehive.
310	Ɓ	vila-vila	5424	tremble with fear	விலவில
This cognates with "vavvāl" (DED 5370), probably a long-tailed fruit bat, with an eerie shivering scene that it creates.
303	)(	iṭa	432	cleft, gap, split, crack open , slit, breach, chasm	இட—
Also works as "iṭaveḷi" ≈ "iṭai-valai".

Signs and affixes

240   Just to give a flavor of the decipherment here we group few signs under base/affix geometry. In some cases there could be more than one affix. For more details see next section "Syllabic development".

Sign ◯

Affix \\ Base	│	‖	⫼	⦀	⦀⦀	Ψ	◌°	◇	◌°│	大°	⦀‑‖
◯	◉	◖◗	◎	⦂◖◗⦂	⊕	⫯	◎	◈	⚲	大◎	⦂⫼⊕
pa	pal	para	pammu	nal-para	pallā	vel-appa	pān	ciṟappu	pānal	pān-an	nal-pallar
பா	பல்	பற	பம்மு	நல்பற	பல்லா	வெல‑ப்பா	பாண்	சிறப்பு	பானல்	பானன்	நல்பல்லர்

Sign ∪

Affix \\ Base	│	‖	⫼	⦀⦀	│◌°	│◌°⦀	Ψ‖	‑‖	⨳ ⫰ Ψ
∪	∪	∪	∪	⨯	∪	∪	∪∪	∪∪	∪∪∪
ū	vaḷ	ūr	ūm	vai	uṭaṉ	uṭai	velūr	chevūr	vel-aṇi-nuṟan-ūr
ஊ	வள்	ஊர்	உம்	வை	உடன்	உடை	வேலூர்	செவ்வூர்	வேலணிநுழனூர்

245 Sign ⋈

Affix \\ Base	│	│◌°	⦀⦀	‖	◁	⫼ ⫼	◗	‑	大
⋈	⋈	⋈	⋈	⋈	⋈	⋈	⋈	⋈⋈	大⋈
ta	taḷ	tan	tai	irutai	ciṟuttai	mumutai	tāṟi	toṭu	tan
த	தள்	தன்	தை	இருதை	சிறுத்தை	மும்மூதை	தாழி	தொடு	தன்

Sign ⚹

Affix \\ Base	│	│	∧	∧	‖	⦀⦀
⚹	⚹	⚹	⚷	⚷	⚹	⚹
kanni	kāl	kōl	peru-kanni	peru-kaṉai	kōnda, gōnde	kanāl
கன்னி	கால்	கோல்	பெருங்கன்னி	பெருங்கணை	கொண்ட, கோண்டே	காணல்

Sign �

Affix	│	‖	│ - │	⚶	-	⋀	│	‖‖ - │
Base	�	�	��	│�│	�	�	�	�│	│�‖
	an	āḷ	aṇṇaṉ	kāvalan	naṭṭan	uṛavan	kīṛṛān	mutalvan	nal-mutalvan
	அன்	ஆள்	அண்ண ன்	காவலன்	நாட்டான்	உழவன்	கீழன்	முதல்வன்	நல்முதல்வன்

Sign ◇

Affix	◇	‖‖	‖‖	⧓	甲	⊛	)
Base	◇	◇	◇	◇	◇	◇	◇
	kō	kōṭṭa, kōṭu	kōṭai	kōṭṭam	nāl-vaṛi-kōṭai	nērciṛa-kō	pallar-kōṭṭa	kōṭai-vaṛi
	கோ	கோட்ட, கொட்டு	கோட்டை	கோட்டம்	நல்வழி-கோட்டை	நேர்சிற-கோ	பல்லர் கோட்டை	கோட்டை வழி

Sign)

Affix	180°	◦	◦ 180°	- 180°	90°	270°	‖
Base	)	(	)	(	)(	⌒	∪	))
	valai	iṭai	valaiyan	iṭaiyan	iṭa	kuṭa, kuṭai	ū	iru-valai
	வலை	இடை	வலையன்	இடையன்	இட	குடை	ஊ	இருவிளை

Sign ◦

Affix	│	│	‖	‖	‖‖	│	◦ │ ◦	│	⨆
Base	◦	⚶	♀	◠◠	8	8	8	⚨	│8	8
	-n	nāṭu	aṇiyal, maṇi	ñāṇ	nan	nannu, nannan	nalnelāḷ	nuṛan	nan-mutal	nāṅkuṛu
	ன்	நாடு	அணியல், மணி	நாண்	-னன்	நன்னு, நன்னன்	நல்நெல் லாள்	நுழன்	நன்முதல்	நன்குழு

Syllabic development

We outline from top to bottom how the syllabary is slowly developed from simple to complex glyphs. Happy journey!

M77 Sign	Glyph	Syllable	DED	Description	Tamil
1	大	an	131, 132	person	அன்
	大大	an(n)-an	131, 132	brother	அண்ணன்
2	大	kāvalan	1417, 1416	security guard	காவலன்
25	大	mutalvan	4950	chief	முதல்வன்
26	大	nal-mutalvan	-	good chief	நல்முதல்வன்
3	大	aṇṇal, āḷ	110, 399	great man, servant, slave, soldier, messenger	அண்ணல், ஆள்
4	大	natt-an	3638	country man	நாட்டான்
5	大	natt-ar-an	3638	country rules	நாட்டாரன்
6	大	cuṭṭiaṉ	2656, 2655	intelligent person	சுட்டியன்
7	大	valiyaṉ, vallavaṉ, vallāṉ, vallāḷaṉ	5276	strong, skilled man	வலியன், வல்லவன், வல்லான், வல்லாளன்
18	大	valiyaṉ, vallavaṉ, vallāṉ, vallāḷaṉ	5276	strong, skilled man	வலியன், வல்லவன், வல்லான், வல்லாளன்
162	Ψ	vēḷ, vēl	5545, 5536	chief, spear, trident	வேல்
8	大	vēlan, vēṭan	5545, 5368, 5527	chief, lance fighter, hunter	வேலன், வேடன்
21	大	vēlan, vēṭan	5545, 5368, 5527	chief, lance fighter, hunter	வேலன், வேடன்
176	∮	vanjī, anjih, añcal	5265, 56, 54	paddy, rice, to take on shoulder, resting place	வஞ்சி, அஞ்சி, அஞ்சல்
19	大	vanjiyan	56, 54	skilled worker	வஞ்சியன்
20	大	vanjiyāḷ	56, 54	helper, social worker	வஞ்சியாள்
38	大	vanjiyan	56, 54	skilled worker, dancer/entertainer?	வஞ்சியன்
9	)大)	valai-vēlan, valaiyan	5288	animal trapper	வலையன்
12	大	uṟavan	688	farmer	உழவன்
13	大	uṟavāḷ	688	farm worker	உழவாள்
14	大	pēr-uṟavan	688	big farmer	பேர் உழவன்
15	大	uṟavūr	688	working, farming town	உழவூர்

M77 Sign	Glyph	Syllable	DED	Description	Tamil
35		valaiyan	5288	trapper, fisherman	வலையன்
37		valaiyan	5288	trapper, fisherman	வலையன்
39		aṇṇal	110	great man, chief	அண்ணல்
41		kīṟāṉ, ciṟuvaṉ	1621, 1594	poor, boy	கீழான், சிறுவன்
42		pallan	3986a	mahout	பல்ல(வ)ன்
43		aṭiyavaṉ, aṭiyāṉ, aṭiyōṉ, mutalvan	72, 4951	slave, chief	அடியன், முதல்வன்
54		pu	4345	flower, insect, flourish, bloom, create	பூ (பூச்சி)
55		pol	4550	flowering, flourishing, blooming, creating	பொலி, பொலிவு
374		-n	1159b, 3621, 3621a	night, bug	நீர் (துளி), (ப)னி, நள், நல்லு
410		ñāṉ, nāṉ	2908, 3639	string, me	நாண், நான்
415		nāṉṉan	2908, 3639	twiner	நாணன்
417		nalnelāḷ	-	good farmer	நல்நெல்லாள்
412		nāṅkuṟu	2906	earthworm	நாண்குழு
186		kūṟu, kuru	1924, 1921, 1782	section/division/ share, to proclaim, brilliant	கூறு
299		ida, idai	449	hip, left	இட-, இடை
301		idayan	450	herder, herdsman	இடையன்
287		vala-, vaḷai	5313, 5314, 5288	bent, trap, right, net	வல, வள, வலை, வளை
288		valacal	5278	emigration, flight	வலச்சல்
298		valaicci, valaiyacci	5288	surround, trap, hunter	வளைச்சி, வலையச்சி
293		valaiyan	5288	animal trapper (short form)	வலை வேலன், வலையன்
303		iṭa, iṭavai	432, 434	narrow way	இட, இடவை
187		kutai-kuru	1714	notch at end of bow	குதைகூரு
312		kuṭi, kuṭai	1655, 1660	house, family, lineage, hollow, cavity, penetrate	குடி, குடை
313		kuṭir	1655	house, family	குடிர்
314		kuṭima	1655	house, family	குடிம
315		kuṭi-ēṟu	1655	immigration	குடிஏறு
316		kurhu-kuṭi	1785-1655	deer/antelope- shelter	குர்ரு-குடி
317		mūri-kuṭi	5041-1655	buffalo-shelter,	மூரி-குடி

M77 Sign	Glyph	Syllable	DED	Description	Tamil
				barn	
318		nāl-vaṟi-peru-kuṭi	1655	cross-way-big-shelter	நால்வழி-பெருங்குடி
395		mu-kūṭal	1882	three-way-river-join	முக்கூடல்
328		vu	651, 761	ooze, mortar	வ, உ, ஊ
?		vala, vala	5304	strong, fertile	வல-, வள-
32		uvan		person between two	உவன்
330		mūṟ	5046	mature, ripe	மூழ்
332		vai	5549-53	to stay, straw of paddy, to abuse, sharp	வை
336		uṭaṉ, valaṉ	945	with, consent, immediately	உடன், வலண்
337		uṭai	593	wealthy	உடை
342		ūr (ural, uṟi)	752 (651, 708)	town, village	ஊர் (உரல், உறி)
347		vēlūr	-	hunter's town	வேலூர்
358		cevūr	-	bronze worker's town	செவ்வூர்
344		ūr-ar	-	important sign with clitics	ஊரார்
343		ūr-il	-	important sign with clitics	ஊரில்
373		pa	3805, 4016, 4124, 3884	sun, pot	பகல், பள்ளம், பானை, பண்
375		pal, pala	3986a	teeth, many	பல், பல
386		poli, poḷi	4550, 4560	prosperous, chisel	பொலி, பொளி
379		pammu, pollam	3934, 4554	to baste, to yarn, stitch, joining	பம்மல், பொல்லம்
384		pallā	3986a, 1045	elephant	பல்லா (யானை)
391		pallā	3986a, 1045	elephant	பல்லா (யானை)
		Depicted by the ornamental oval-shaped plate that is fixed on it's forehead			
392		nal-pallar (nalla-palla-iru)	-	good mahout	நல் பல்லர்
393		pallar-kuṭi	1655	mahout hamlet	பல்லர்குடி
403		paṟai, paṟṟu	4031, 4032, 4034	announcement (sale) with a drum beat	பறை, பற்று
407		pulam	4303	arable land	புலம்
406		paḷapaḷa	4012	glittering, well-oiled	பளப்பள
404		nal-paṟai		good	நல்ல பறை

M77 Sign	Glyph	Syllable	DED	Description	Tamil
				announcement	
387	⊎	vēlappa		worker, hunter	வேலப்பன்
389	⊘	pañ-nilam	3837	ploughed land	பண்னிலம்
254	뇌	paṭi, paṭṭi	3848, 3850, 3868	hamlet, village, settlement, rest, roost, step gradee, rank	படி, பட்டி
216	⋈	ta (tandi, tondi, tavalai)	2946, 3110, 3549	earthen pot	தண்டி, தோண்டி, தவளை
217	⋈⋈	toṭal, todu, toṭu	3480, 3482	touch, begin, join, to wear, dress-up	தொடல், தொடு
53	⋉	tāvu	3177	jump, luxuriant, tread gently	தாவு, தவளை
222	⋈	tal, tol	3123, 3105, 3516	obstruct, stop beat, crush, old, ancient	தள், தொள்
223	⋇	mumuta	4954	grand-parent	மும்மூத
229	⋈	taṟ, tāṟi	3178	bow down	தாழு, தாழி
36	ⵌ	-tan	-	-	-தன்
?	◎	pān	4068	song, melody	பாண்
396	ⵀ	pāṉal	4071	rice-field	பாணல்
31	ⵌ◎	pāṇan	4068	tamil bard	பாணன், பாடுபவன்
40	ⵙ	paṟaiyaṉ	4032	drummer	பறையன்
59	ⵔ	kaṇ, kanni	1159a, 1166, 1168, 1417, 1483	bamboo raft, trap, trapper	கண், கன்னி
60	ⵔ	nalla-kanni	-	good vehicle, good trapper	நல்ல கன்னி
67	ⵙ	kondu, kōnda, gōnde	2053, 2216	bull, with	கொடு (கொண்டு), கோண்டே, கொண்டே, கொண் ட
72	ⵔ	kōl	2238	boat, raft	கோல்
70	ⵕ	kāl	1483	cart	கால்
65	ⵕ	peru-kanni		big boat, big cart	பெருங்கன்னி
75	ⵖ	peru-kaṉai	1404	intense, abundance	பெருங்கனாய்
69	ⵗ	kaṉṉal	1305, 1415	vessel, ship	கண்ணல்
66	ⵕ	nal-peru-kanni	-	great good gentleman	நல்பெருங்கன்னி
66	ⵕ	nal-peru-kanni	-	great good gentleman	நல்பெருங்கன்னி
58	ⵞ	muttu	4959, 4932, 4957	pearl, excellent, praiseworthy	முத்து
78	ⵘ	pori, puri, puṟā, puṟa, pūṟ	4286, 4334, 4374, 4603	courage, pride, chicken, pigeon,	புரி, பொரி, புறா,

M77 Sign	Glyph	Syllable	DED	Description	Tamil
				dove, quail, pheasant	
77		paraṇ-	4020	bird farming, sustainer	பரண்- (பறந்தூர்)
79		cuṭṭi-paraṇ	2655-4020	crested pheasant	சுட்டி பரண்- (பறந்தூர்)
80		paraparaṇ	3949	bird farming, pigeon messenger?	பறப்பரன்
81		valai-pori	-	trapping bird	வலைபொரி
319		muri, muṟi	4977, 5010, 5008	twist, twine, tender leaf, shoot, sprout, break, perish	முரி, முறி, முருக்கு
134		peru, pēr	4411	big, large	பெரு, பேர்-
204		meruku, mēruve	5074, 5094	shining, pyramid	மெருகு, மேரு
205		nal-kompu, nāmpu	2115, 3649	good clever, sprout of millet	நால்கொம்பு, நாம்பு
206		mū-mēññal, mū-mēval	5097, 5096	long-lasting plough/desire	மூமேன்னல், மூமேவல்
207		nal-mū-mēññal, nal-mū-mēval	5097, 5096	good long-lasting plough/desire	நல்மூமேன்னல், நல்மூமேவல்
209		mēval	5096	join, unite	மேவல்
210		mēyccal	5093	grazing, pasture	மேய்ச்சல்
261		kō	2177, 2178	mountain, gentry	கோ, கோட்டை
	Origin of the word "kō" could be the Gond people (gōnde, DED 2216) of the mountains, reinforced by the West wind, from western practice of having kings in Sumeria				
30		kōvan		herder, herdsman, gentry	கோவன்
	Cattle class that eventually becomes the ruling gentry				
267		kōṭṭa, kōṭu	2207, 2053, 2203, 2200	gift, munificence, fort, gentry (west wind, western practice of having kings in Sumeria), horn	கொட, கோட்ட, கொடு, கொம்பன்
272		kōṭai, kōṭai	2207, 2049	fort, gift	கோட்டை
271		kōṭṭam	2058	cattle-shed	கோட்டம்
244		aṟu, āṟṟu, aṟai, araṇ	317, 407, 322, 201	strong, dwellment, camp, room, castle	அறு, ஆறு, அறை, அரண்
242		māṭi, māḷika, māṭam, māṭu	4796a, 4798	mansion, terrace, ox	மாடி, மாடு
197		mē, mēṭu, mettai	5086, 5058, 5069	top, terrace	மேல், மெத்தை
198		mē-mū	5086	higher maturity	மேமூ

M77 Sign	Glyph	Syllable	DED	Description	Tamil
199		mē-vēl	5086	excellent hunter	மேவேல்
200		nal-mē	5086	good excellence	நல்மே
402		nāṭu	3638	country (as a contrast to forest)	நாடு
245		taṭṭi, taṭṭu, taṭṭāṉ	3036, 3039	cloth, wooden frame, hammer, tap	தட்டி, தட்டு, தட்டான்
296		vaṛi	5297	way	வழி
149		nālvaṛi	5297	cross-road	நால்வழி
297		aruvaṛi	5297	six-way crossing	அறுவழி, ஆறுவழி
135		peruvaṛi	5297	big way	பெருவழி
136		aim perumvaṛi	5297	five big way	ஐம் பெருவழி
153		poruḷ, poṛal, poṛil	4544, 4555, 4558	object/goods, town, earth/country/district	பொருள், பொறல், பொறில்
155		ampi	177	boat, raft, ship	அம்பி
211		anuppu (ampu), aṉpu	329 (178), 330	send, love	அனுப்பு, அன்பு
212		mitavai-anuppu	4841	send boat	மிதவை அனுப்பு
213		varu-ampi	5270, 177	receive boat	வரு அம்பி
83		iṛakkam, iṛappu, iṛakkam, iṛappu	501, 514	death	இழக்கம், இழப்பு, இறக்கம், இறப்பு
50		āṭu	347, 5152	dynamic, enjoy, play, dance, goat	ஆடு
124		ēr	2815	plough	ஏர்
125		eru	863	full, strong	எறு
126		cēr	2814	join, unite, mingle	சேர்
161		vilaku	5423	diverge	விலகு
137		cēri	2007	village street, assemblage, hamlet	சேரி
138		perum-cēri	207	big assemblage	பெரும் சேரி
139		mēl-cēri	207	high assemblage	மேல் சேரி
140		nal-iru-cēri	-	good, strong assemblage	நல்லிருச்சேரி
141		cēri-vaṛi	-	road to assemblage	சேரிவழி
142		cēri-vaṛi-anjih		road to assemblage resting place	சேரிவழிவஞ்சி
47		araṇ, araṇa, araṇai	201, 203, 204	fortress, gift, squink	அரண், அரண, அரணை
48		nal-araṇ, araṇ-nal-, aṛa-nal-	-	good defence, good fort, good gift	நல் அரண், அரநல்-, அறநல்-
48-1187		aṛam	311	virtue, moral duty	அறம்

M77 Sign	Glyph	Syllable	DED	Description	Tamil
113	(||||)	viḷai-ñālam	5437, 2913	fertile land	விளை நாலம்
415		mū-pala	7-	important many	முப்பல
171		nil-(v)anji, nilai	-	stable	நில்வஞ்சி, நிலை
?		nal-inai, nāl-inai	-	good joining, joining four	நல்லிணை, நாலிணை
49		kuṟumpu, kuḷampu	1844, 1829	chieftain (kuṟumba tribe)	குறும்பு, குளம்பு
51		māṟu, māṟṟu, māṟṟi , māṟan, iruvaṟi-māṟan-kuṟumpu	4834	barter, strong leader	மாறன், இருவழி-மாறன்-குறும்பன்
302		māṟṟal	4834	exchange	மாற்றல்
129	∧	koḷ	2151	seize, acquire	கொள்
130	√	koḷal	2151	exchange, buy/sell	கொள்ளல், கொள்முதல்
148		cērukoḷ	5297, 2151	exchange, buy/sell	சேர்ந்துகொள்
237		mutal	4951	base, foot, stump	முதல்
238		mutal-vaṟi	4951	eminent way	முதல்வழி
239		mutal-ciṟa	4951, 2589	first eminent	முதல் சிற
304	D	vil, viḷ	5422, 5421 5432, 5433	bow, call out, sell	வில்
305		viḷai	5437	productive, mature	விளை
127	⌐	alaku, alanku, aṟagu	239, 240, 246, 255	beak, beauty, grains of paddy	அலகு, அழகு
306		aṟaku-vilam	-	good home	அழகு ிஇல்லம்
307		viḷampu	5433, 5434	proclaim openly, serve food	விளம்பு
17		villavaṉ	5422	archer	வில்லவன்
28		viḷampan	5434	one who superintends the distribution	விளம்பன்
310		vila-vila	5424	tremble with fear	விலவில
397		aṇi, aṇiyal, maṇi-	116, 4672	jewel, pearl necklace	அணி, அணியல், மணி, முத்து மாலை
398		peru-aṇi(yal)	116	big pearl necklace	பெரு அணி
377		nal-aṇi-pala	-	many good pearl necklaces	நல் அணி பல
233		mumalai	-	three mountain range	மும்மலை
235		mumalai-vēl	-	three mountain hunter	மும்மலை வேல்
180		koṭṭu, koṭṭam	2063, 2064, 2066	pour, sting	கொட்டு (தேன்), கொட்டம்
181		koṭṭu	2063, 2064	pour, sting	கொட்டு

M77 Sign	Glyph	Syllable	DED	Description	Tamil
169		nilam	3676	land, ricefield	நிலம்
171		nilai	3675	firm, stable	நிலை
173		irunilai	3675	very firm, stable	இருநிலை
174		iru-nilam	481, 3676	great/vast land	இருநிலம்
88		nal-iru	3610, 480	fine life	நல்லிரு
176		vanjī, anjih, añcal	5265, 56, 54	paddy, rice, to take on shoulder, resting place	வஞ்சி, அஞ்சி, அஞ்சல்
166		vēl-vanjī	-	hunter's lair	வேல்வஞ்சி
249		māṭṭu	4801, 4802	fasten, put in, fasten, hook, kindle, fire	மாட்டு
253		māṭṭal	4802	necklace	மாட்டல்
252		māṟṟam (māṭṭu + mu)	4834	exchange, barter	மாற்றம்
182		iṭa-vaṛi-er	432/434, 3419, 903	guide, conduct, conduit	இடவழியேர்
178		kalappai, kalam	1304	plough, vessel, ship	கலப்பை, கலம்
323		il, ila	494, 497	non-existence, leaf	இல
325		ila	497	leaf	இல
326		ilai, iḷai	497, 496, 513	leaf, young	இலை, இலஞ்சி
327		iḷavaṛian, iḷaivaṛian	-	horticulturalist?	இலைவழியான்
76		cē, cēval	1931, 2818	red, bronze, cock	சே, செம்மை, சேவல்
311		yāṛ, eṛil	5156	harp, music, beauty	யாழ், எழில், இசை
400		nuṛan	3714, 3715	penetrate, stitch	நுழ-, நுழைன், நுழம்பு, நுளம்பு
219		tai (ta + kaccai)	3473	sew, stitch	தை
214		irutai	481, 3473	strong stitch, good tailor	இருதை
?		cī, cīpu, cil, calli	2599, 2622, 1577, 2382	cleanse, wooden peg, splinter	சீ, சிப்பு, சில்
240		cil	1577	small	சில்
241		ciṛa	2589	eminent, illustrious	சிற-
381		ciṛappu	2589	eminent, illustrious	சிறப்பு
256		nērciṛa	3772	just and eminent	நேர்சிற
266		nērciṛa-kō	2177	just and eminent leader	நேர்சிற கோ
215		ciṛuta, ciṛuttai	2590	panther, leopard	சிறுத்த, சிறுத்தை

M77 Sign	Glyph	Syllable	DED	Description	Tamil
258		cīrmai	2624	excellence, greatness	சீர்மை
257		cutti, cuttiyal	2668	small hammer	சுத்தி, சுத்தியல்
259		cutti, cuttiyal	2668	small hammer	சுத்தி, சுத்தியல்
192		paḷḷi	4018	hamlet, herdsman's village	பள்ளி
193		perum-puli	4307, 4411	big tiger	பெரும்புலி
321		ñāṇ	2908	marriage string, necklace	நாண்
322		nēññil	2907	plogh-shaft	நென்னில்
367		nānan	2908	yarn maker	நாணன்
82		taṟupu	3142, 3169	to join together, amass (wealth)	தறுப்பு (தாரா - வாத்து)
247		ciḷ-eṉal, ciḷu-ciḷ-eṉal	2588	noisy, bubbly	சிள்-எணல், சிளு-சில்-எணல்
341		uṟu	689	harrow	உழு (பரப்பு, பரம்பு)
177		nal-mutal, nalāl	-	good chief, good worker, hard worker	நல்முதல்-, நல்லாள்
409		nan-nil	3588	good standing	நன்னில்
365		viri	5411	spread, expand, blossom	விரி
190		pāḷaiyam	4117	army camp, village surrounded by hillocks	பாளயம்
189		toṭṭi, tōṭṭi	3485, 3547	fence, rake	தொட்டி, தோட்டி
191		toṭṭil	3486	cradle	தொட்டில்
202		mēṭṭu, mēḍu, metta	5058, 5069	height, eminence, hillock, upper storey, storied house	மேட்டு, மேடு, மெத்த
203		peru-mēṭṭu, peru-mēḍu, peru-metta	5058, 5069	height, eminence, hillock, upper storey, storied house	பெருமேட்டு, பெருமேடு, பெருமெத்த
188		mett-eṉal	5070	gentleness	பெத்தெனல்
366		utaḷ	610	goat	உதல்

Common phrases

Here we list multiple logos (mostly pairs and triplets) that commonly occur together in IVC. We also list a few non-aglutinative entangled glyphs which we try to describe them as complex mixed states.

M77 Signs	Glyph	Syllable	DED	Description	Tamil
321-336	⋔Ɱ	uṭaṉ-ñāṇ	2908	marriage	உடன் நாண் (உடன்தை)
		Sign-336 Ɱ also has ideographic mortar & pestle marriage association as well				
176-321-336	Ɛ⋔Ɱ	uṭaṉ-ñāṇ-anjih	2908	marriage hall	உடன் நாண் அஞ்சி
148	卐 = Ⅹ+√	marukoḷal, cērkoḷal	5297, 2151	barter, exchange, buy/sell	மாறுகொளல், சேர்ந்துகொளல்
12-124	釆人	ēr-vuṟavan	-	farmer	ஏர் உழவன்
169-124	𐌙人	ēr-nilam	-	farm land	ஏர் நிலம்
113	(꜋꜌)	viḷai-nallam	5437-3613	cultivable rich soil	விளை நல்லம்
130-51	√𐎛	maṟu-koḷal, iruvaṟi-māṟan-kuṟumpu-koḷal	-	barter	மாற்று கொளல், இருவழி-மாறன்-குறும்பன் கொளல்
402-267	⋔◇	koṭa-nāṭu	-	herder country	கொட நாடு
402-293	⋔⟩	valaiyan-nāṭu	-	trapper's country	வலையன் நாடு
402-76	⋔ツ	cē-nāṭu	-	red country, bronze country	சே நாடு
67-65	✕⟁	peru-kanni-kondu	-	with big vehicle	பெருங்கன்னி கொண்டு
70-67	⟁✕	konda-kal	-	bullock cart	கொண்டா கல், கோண்ட கல், மாட்டு வண்டி
70-67-65	⟁✕⟁	peru-konda-kal	-	big bullock cart	பெரு கோண்ட கல், பெரு மாட்டு வண்டி
176-307-379	Ɛ⍭◉	pammu-vilambu-anji	-	bow stringer's resting place	பம்மு வில்லம்பு அஞ்சி
402-379-319	⋔◉↺	mura-pammu-nadu	-	yarn twisting country	முறபம்மு நாடு
342-379-398	℧◉⚹	perum.aṇi-	-	big necklace maker's town	பெரும் அணி பம்மூர்

M77 Signs	Glyph	Syllable	DED	Description	Tamil
		pammu-ūr			
372 = 342+400+ 397+162	⚏ = Ŭ✗♀Ƴ	vel-aṇi-nuṟan-ūr	-	town with hunters, pearl and cloth workers	வேல்திரள்நுழனூர்
194 = 342+400+ 397+162	⚏ = ǀ ∧ ⋔ ‖ ⫴	mu-iru-mēl-per-ul	-	the mighty mēl-perul	மூவிரு மேல்பொருள்
96-409	⫴⫴⫴ ⊙⁰	nannilai (nannu-nil-ai)	3588	amiable	நன்னிலை
94-409	ǀ⫽⫽ ⊙⁰	nanniral (nannu-niral)	3672, 3673	make orderly	நன்னிரல்
99-350	⸚ Ŭ∿	veḷḷāḷar	5507	agriculturalist	வெள்ளாளர்
315-108	⸚⫴⫴⫴⫴⫴	aṟu-kuṭi-ēṟu		river flooding houses	ஆறு குடி-ஏறு
87-89	‖ ⫴⫴	muṟa	5015	custom	முற, முறை
319-101	⌒¦	mutal-mutal-muṟi	5010	first initial tender leaf	முதல் முதல் முறி
342-403-103	Ŭ ⊗ ¦¦	īṟal-para-ūr	553	grief (death) mesenger town	ஈறல் பறையூர்
328-222	∪ ⋉	tāḍu, tallu	3156, 3105	butt with horns, gore, crush, beat	தாடு, தல்லு

260 # Glyphs grouped under categories

A word of caution must be mentioned here that since these are primarily syllables, their actual use in a text may not correlate to below category.

Description	M77 Signs	Glyphs	Tamil
Activity-based countries	261, 391, 162, 245, 12, 326, 400, 311	◇, ⊗, ⟩, ⊞, ⚘, ⚶, ✗, ◗	கோவன், பல்லவன், வலையன், தட்டான், உழவன், இலையன், நுழம்பன், பானன்
Farming: farmer, farm town	12, 15, 178, 124, 341	⚘, ⚘, ⚶, ⋏, ⨤	உழவன், உழவூர், கலப்பை, ஏர், உழு
Horticulture: leaf, flower	326, 54	⚶, ⚶	செடி, பூ
Hunting: trapping, spear	35, 293, 162	⚘, ⟩, Ƴ	வலையன், வலையன், வேலன்
Cattle farming: herding and selling	261, 267, 30, 301,	◇, ◇, ⚘, ⟨	கோ, கோட்டை, கோவன், இடையன்
Carpentry and metallurgy: metal and wood work	245	⊞	தட்டி (தட்டான்)

Description	M77 Signs	Glyphs	Tamil
Tayloring: stitching	400, 219, 182	⋈, ⋘, ⚲	நுழல், தை, அணி
Honey gathering	180	⧛	கொட்டு தேன்
Singing: harp, musician	311, 31	◗, ⚲◎	யாழ், பாணன்
Trade: barter, buy/sell	51, 129, 130, 302, 148	⧆, √, ∧, ⚝, ⌐┐	மாறன், மாற்று, கொள், கொள்ளல், மாற்றல், சேர்ந்துகொள்ளல்
Transportation: ship, boat, raft, manual cart, bullock cart, boat	59, 65, 70, 72, 67, 155	⚵, ⚶, ⚴, ⚵, ⚸, ✝	கன்னி, பெருங்கன்னி, கல், கொல், கொண்ட, அம்பி
Movement: goods, send	153, 211	↑, ⚲	பொருள்/பெருமுதல், அனுப்பு

Fish signs and it's varied manifestations

If we look at the frequency of the consonants in Tamil (both modern and old), the one that comes on top is "ka" and not "ma" or "mi". We know that the fish sign is the most frequent in Indus script, so the obvious Turing's not so enigmatic result is that the fish sign must start with "ka" and we found "kanni" is probably more feasible. However, our result "kanni" is independent of it and was inspired by M.V.Bhaskar's interpretation (personal communication) that the "Garial" (the river crocodile) is synonymous with fish and was probably trained and used as a boat. My own personal exposure to local customs also revealed that "kanni" is a term used commonly in earlier times for boat or any vehicle. The analogy could be that "kanni" refering to a women carrying children or it could be that the boat itself was driven by women in those days. However, this analogy is not without it's difficulty. The word "kaṇṇi" refered in modern Tamil to be a maiden is without any support in DED [1]. The only support comes the word "kaṉi" according to DED 1408 is "tender", "love", "devotion" etc., and so is "kātal" DED 1445 - "love", "affection", "lust" etc. From not so mystical angle it could be just derived from "kaṇ" DED 1159 "eye", "peacock's tail", probably leading to a mystical euphemism. Support from another quarter is "traveling places" come from DED 1443 "kāṉ" – "to see", DED 1161 "kaṇ" – "place", DED 1166 "kaṇai" - "arrow", and DED 1109 "kaṭa" - "to move". The interpretation that it is "kaṇṇi" is reinforced by other evidences like sign-63 "kaṇṇi-pori", where it is meant as a "snare" DED 1183+4538.

Assuming that sign-59 ⚵ is "kaṇṇi", it could mean any of these things: vehicle, boat, cart, trap, trapper, soft, tender etc. We will show lines of text that seem to provide such evidences, but before that we decide a few variants of fish sign and phrases:

Standalone fish signs

M77 Sign	Glyph	Syllable	DED	Description	Tamil
59	⚵	kaṇ, kaṇṇi	1408, 1109, 1183, 1159	boat, bamboo raft, soft, trapping	கண், கன்னி
72	⚵	kōl	2238	boat, raft	கோல்
70	⚴	kāl	1483	cart	கால்

65	⚲	peru-kaṇṇi	-	big boat	பெருங்கன்னி
67	⚲	kondu, kōnda, gōnde	2053, 2216	bull, with	கொடு (கொண்டு), கோண்டே, கொண்டே, கொண்ட

285 Fish sign phrases

M77 Signs	Glyph	Syllable	DED	Description	Tamil
67-65	⚲⚲	peru-kanni-kondu	-	with big vehicle	பெருங்கன்னி கொண்டு
70-67	⚲⚲	kondā-kāl	-	bullock cart	கொண்டா கல், கோண்ட கல், மாட்டு வண்டி
70-67-65	⚲⚲⚲	peru.kanni-kondā-kāl	-	big bullock cart	பெருகன்னி கோண்ட கல், பெரு மாட்டு வண்டி
72-67	⚲⚲	kondā-kōl	-	bullock raft?	கொண்டா கோல்
59-328	⚲U	u(ka)-kanni	559, 563	boat rising in waves	யுக கன்னி

Reading lines of text with fish sign

Sample line 1 (kanni = trapper)

⚲ ⁂ ⚲ |

mutal-vilampan-mu.malai-kanni
முதல்-விலம்பன்-மும்மலை-கன்னி

Semantics:
290 Chief archer, an expert trapper of three mountains

Sample line 2 (kanni = transport vehicle)

⚲ ⚲ ⚲

nilai-kanni-anupu
நிலை-கன்னி-அனுப்பு

Semantics:
(Please) sends (goods) by a stable boat/raft/cart

Sample line 3 (kanni = boat/raft)

⚲ U ⚲ ⚲ ⚲ ‖ ⚲ ⊕

palla-ar-iru-kanni-kōl-velan-ūr-anupu
பல்லர் இரு கன்னி: கோல் (மூலம்) வேலனூர் அனுப்பு

Semantics:
Elephant town turthful kind man: sends (goods) by boat to hunter's town

Agriculture and it's related signs

M77 Sign	Glyph	Syllable	DED	Description	Tamil
12	枆	uṛavan	688	farmer	உழவன்
13	枈	uṛavāḷ	688	farm worker	உழவாள்
14	枌	per-uṛavan	688	big farmer	பேர் உழவன்
15	枍	uṛavūr	688	working, farming town	உழவூர்
112	''''	ñālam, nallam	2913, 3613	land, fertile black-soil	நாலம், நல்லம்
169	ὗ	nilam	3676	land, ricefield	நிலம்
169-112	ὗ''''	ñālam-nilam	2913-3676	fertile land, ricefield	நாலம் நிலம், நல்லம் நிலம்
113	(''''')	viḷai-ñālam	5437, 2913	cultivated land	விளை நாலம்
389	ⓣ	pañ-nilam	3837	ploughed land	பண்ணிலம்
178	𝔸	kalappai	1304	plough	கலப்பை
124	人	ēr	2815	plough	கலப்பை
341	ㅂ	uṛu	689	harrow	உழு (பரப்பு, பரம்பு)
176	⧣	vanji	5265, 56, 55	paddy, rice	வஞ்சி
412	⅋	nāṅkuṛu	2906	earthworm	நாண்குழு

Franklin Southworth [6] work on connection between rice cultivation and Dravidian language shows how vanjī is related to rice:

"vari-(n)ci (with variants *vari, *varici, *varinci) 'rice, paddy' DED 5265 can be reconstructed for Proto-Peninsular Dravidian ... It is the source of the word for 'paddy'—i.e., rice in the field or after harvesting and threshing, either husked or unhusked, but not yet cooked—in most of the modern Peninsular Dravidian languages. This word may be connected to the Elamite bar 'seed'—though there is some doubt, as the phonetic correspondences are not regular. A related form, *ari-ci/ki, with variants ari, arici, akki, arki (the last two ← *ariki) DED 215"

The Indus barter exchange system

We only illustrate the key points here. The local barter happens in the undocumented unorganized sector at the cross-roads (⊠), in what is termed as "cantai" (சந்தை) in modern Tamil. The exchange is abstracted by the symbol ⊠ and the barter mediated by 𝔐 (maran?), who is usually qualified by great reliable ancestary (flowery self-praise by the system). The exchange is done by symbol √ (kol, the dagger of exchange) and ⊠ (an abstraction of the cross-road, ⊠). Most of the script pertains to official barter transactions of Indus, which are really instructions of transporation mode and the origin/destination. The clitics like ⁖ (M77-99) orchestrate the sentence structure of the lines of the seals. An highly compressed form of information exchange mechanism is enabled by the drsastic use of poly-semantic logo-syllabic script with each of these logo-syllables having many semantic possibilities with high degree of pun. This is so deeply wedded to Indus culture and mode of

exchange that the deciphering of it has taken so long. The skills of bronze-age artisans is in full display here with those hundreds of poly-semantic logo-syllables crafted and designed with care to work in those small spaces available in the seals. What is interesting that the deeply mysterious swastic symbol (M77-148) is now understood as the mundane:

$$ 卐 = \mathbb{X} + \sqrt{} = \text{cērukoḷ} = \text{சேர்ந்துகொள்} $$

i.e., declaration of an important exchange, which is usually followed by drum beats. The drum beats are also a way to invite more people to the square for exchange (at cross-roads).

Relative volume of trade

We consider the absolute occurance numbers in the text and also the association to the right of sign no. 99. If we assume that what procedes (to the right of) sign. 99 is the sender of goods then we get the following data:

Glyph	Description	No. occurances	Forward transactions
◇	Cattle	369	290
⊗	Ivory	182	82
)	Hunting and trapping	130	61
ʸ	Agriculture	225	18
⦀	Honey	44	18
◈	Elephant herding?	15	10
⊗	Cross-road	41	8
⚔	Tailoring	14	4
φ	Jewellery	12	3

Among 634 occurances in IVC text with sign no. 99, assuming that what comes to it's right is the region that is sending commodities to the other regions, we can summarize that cattle and agriculture were the dominant activities, closely followed by carpentry and elephant-based products. Hunting, honey-gathering, fishing, carpentry, weaving and stitching were the other important activities that created products participating in the organized barter system of IVC. Hunting, honey-gathering, fishing, carpentry, metallurgy, weaving and stitching were the other important activities that created products participating in the organized barter system of IVC.

Class structure of IVC

It seems from the table above that the cattle herders had the dominant trade surplus and probably the agriculturists had the highest trade deficit. Sign-41 ⅄ kīṛān (DED 1621) கிழான் refers to a poor person and studying his concordance we see that he is strongly associated with sign-137 𝕏 cēri (DED 207) சேரி, a place where many people assemble, associated in modern terms with the hut dwelvements or slums in cities. It is quite surprising that this association has remained true for 5000

years! It is also noted that sign-41 𝕂 (kīrān) has atleast one association with all professions, except cattle herding (sign-267 ◇). So it is clear that there is a class structure associated with IVC which puts cattle-herders (◇) at the top.

345 Praise heaped on the farmer

The barter system's accumualtion of wealth by the ruling elite (sign-30 𝕂 "kovan"), accumulated in store-houses (sign-267 ◇ "koṭṭa") necessiates a rhetoric of praise on the toiling farmer (sign-12 ꩜ "vuṛavan") like:

M77 signs	Glyphs	Syllable	Tamil	Description
12-75	꩜ 𝕒	peru.mu.kanni-vuṛavan	பெரும்மூக்கன்னி உழவன்	Enormously mature and soft farmer
12-2-86	꩜ 𝕂‖	mutal-kāvalan-vuṛavan	முதன்மை காவலன் உழவன்	First guardian farmer
12-325-86	꩜ ꩜ ‖	mutal-ilai-vuṛavan	முன்னிலை உழவன்	The foremost farmer

350 Such eulogy of farmer and farming has continued even 2000 years after IVC culture in <u>Thirukkural</u>:
Kural 1031: Howe'er they roam, the world must follow still the plougher's team;
Kural 1032: The ploughers are the linch-pin of the world; they bear.

Frequency of adjectives of towns

Adjectives of towns	Syllable	Frequency	�* Frequency	ꞋꞋ* Frequency	Description	Tamil
꩜	nilam	225	47	18	land	நிலம்
Ψ	vēl	196	40	8	lance	வேல்
꩜	nal-aran	168	114	0	good morals	நல் அறன்
꩜	valaiyan	130	14	54	trapper	வலையன்
꩜	vēl	117	112	0	hunter's town	வேலூர்
꩜	vēlan	104	93	0	hunter	வேலன்
꩜	arai	87	34	0	godown	அறை
꩜	nal-vaṛi	87	44	1	cross-road	நால்வழி
)	valai	80	37	7	net	வலை
)	vari	35	32	0	road	வழி
꩜	ce	32	32	0	bronze town	செம்பூர்
꩜	peru-vaṛi	35	23	0	big road	பெருவழியூர்
꩜	puli	25	21	0	tiger country	புலி
⊞	tatti	134	70	6	smithy/carpenter	தட்டி
𝝠	er	78	16	0	plough	ஏர்
))	iru-valai	51	28	0	strong net	இருவலை
꩜	tai	129	40	9	tailor	தை
꩜	ilai	32	18	0	horticulturist	இலை

Adjectives of towns	Syllable	Frequency	Ṷ* Frequency	̈* Frequency	Description	Tamil
(ⵣ)	vālai-kanni	13	12	0	fishing	கன்னி வலை
!!!!	nalnellal	61	14	8	good farmer	நல்நெல்லாள்
('!!!)	vilai-nallam	17	15	0	fertile rich land	விளை நல்லம்
⌐|	mēl	56	14	2	uptown	மேல்
ⵌ	mu.iru.mēl.pēr.ul	56	27	1	mighty uptown	மூவிருமேல் பொருள்

Other adjectives (praise) and their frequencies

Adjective	Syllable	Frequency	Description	Tamil
⌀	nal-aran	168	good moral	நல் அறண்
ⵌ	mu.iru.mēl.per.ul	56	mature-truthful-all-mighty	மூவிருமேல்பொருள்
		mutal	143	chief, foremost,	முதலாம், முதலவன்
|||	mū	300	mature	மூ-
⌐|	alaku	47	beauty, unperturbed	அழகு, அலங்கா
ⱁ	nilai	130	firm, stable	நிலை
ⱂ	iru-nilai	38	very firm, stable	இருநிலை

355

Postpositions and their fequencies

This is the equivalent of prepositions in English, but in Tamil they are post-positions and not pre-positions.

M77 sign	Glyph	Frequency	Syllable	Description	Tamil
336	Ṷ	229	utan	with, together, agreement	உடன்
99/100	̈	663	-ar	it's	-ஆர்
123	)	189	-ar	it's	-ஆர்
97/98	̤	174	-il	-in	-இன்

360 # Broad observations

One of the surprising observation in this decipherment is that almost no individual identities like personal names are found in the text. All trade transactions are from one collective identity like country, village/town to another country, village/town. Individuals are extolled within the colective identity of farmers, workers, etc. There are however, strong leadership role identitites like chief

365 "mutalvan", "peru(m)-kanni", "mu-velan", "iru-velan" etc. It seems that there are store houses were the items are sent and dispersed through some social mechanism of distribution. It seems that the distribution process could be related to sign-37 ⵏ "viḷampu" (DED 5434) and sign-28, ⵎ "viḷampan" seems more like the supervisor of distribution of goods. Sign-17 ⵟ (villavaṉ, villōṉ)

seems like another protection officer cader maintaining law and order. Probably the sign-176 ⌇ "anjih" is a place each of the specialized workers like tailors, jewellery makers, carpenters, bronze workers, ivory workers, with each having a separate specialization location in town where others can reach them as targets for exchange. This tradition continues in many town in India even now, although in rapid decline with the arrival of multispeciality supermarkets.

Semantic reading

The whole exercise of decipherment will be meaningless gibberish if it doesn't lead to any to proper semantic outcomes. We have already seen a range of professions, towns and trade symbols that we are able derive from the excercise. We will now read a few lines using the above syllabary that we have declared.

1. M77 Line 1006-100101

NFM font equivalent rendering:

Very clever trapper velappan of the triple mountain: sends by boat along the big river with care to the tiller of land
பறவைகளை வேட்டையாடி விற்க்கும் மும்மலையார் வேலப்பன்: பெருங்கண்ணி உடன் முன்னிருந்து அம்பி (படகு) ஏர் உழும் நில(த்துக்கு)

The break-up steps:

ᵐ(🐾)ℇ: valai-puri (*வலை-புரி*) mu-malai-ar (*மும்மலை-யார்*)

ⓘ: velappa (*வேலப்ப*)

Ⓤ🕯: peru-kaṇ-uṭan (*பெருங்கண் உடன்*)

‖ ‖‖: mu-iru (*மூ-இரு*)

↑: ambi (*அம்பி*)

ⵖ人: ēr-nilam (*ஏர் நிலம்*)

2. M77 Line 1008-100101

400 NFM font equivalent rendering:

⛎║║Ⓤ☒⛎║☖𝍖

Bronze countryman: sends by bullock-cart to triple mountain
சேவல் நாட்டார்: மாட்டு வண்டி உடன் மும்மலை(க்கு) அனுப்பு(கிறார்)

The break-up steps:

405 ║☖𝍖: cēval-naṭṭ-ar (*சேவல் நாட்டார்*)

Ⓤ☒⛎: kanni-koṇṭa-uṭan (*கன்னி கொண்ட உடன்*)

⛎║║: mu-anupu (*மூ-அனுப்பு*)

3. M77 Line 1029-100101
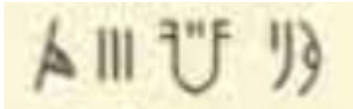
410 NFM font equivalent rendering:

☖║║Ư⟩⟩

Hunter/trapper townsman's three-mountain country
வேட்டையாடி வலை பிடிக்கும் ஊர் மும்மலை நாடு

The break-up steps:

415 ⟩⟩: valai-an-in (*வலையனின்*)

Ư: ur-ār (*ஊரார்*)

☖║║: mu-nāṭu (*மூநாடு*)

4. M77 Line 1032-100101
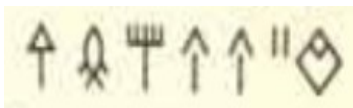
420

NFM font equivalent rendering:

⛎☒Ⓤ↑↑⸚◇

Cattle country: prized goods sent by stable boat
கோட்டூரார்: பெருமுதல் பொருள் நிலை கன்னியில் அனுப்பு(கிறார்)

425 The break-up steps:

⸚◇: koṭ-ūr (*கோட்டூரார்*)

↑↑: peṟu.mutal-poruḷ (*பெருமுதல் பொருள்*)

⛎☒Ⓤ: nilai-kanni-anuppu (*நிலை கன்னி அனுப்பு*)

5. M77 Line 1067-100101

430

NFM font equivalent rendering:

⠐🡒◇🢒🡓

The pearl necklaces are being bartered in cattle country
அணியல் மாற்றம் கொட நாட்டில்

435 The break-up steps:
🡓: aṇiyal (*அணியல்*)

🢒: maṟṟam (*மாற்றம்*)

⠐🡒◇: koda-nāṭu-il (*கொடநாட்டில்*)

6. M77 Line 1088-100101

440
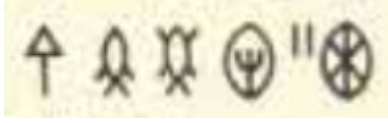
NFM font equivalent rendering:

⇧🡓🡒◉⠐⊕

Elephant country velappan: sends by bullock cart
445 *பல்லார் வேலப்பன்: மாட்டு வண்டியில் அனுப்பு(கிறார்)*

The break-up steps:
◉⠐⊕: palla-ar-velappa (*பல்லார் வேலப்பன்*)

🡓🡒: konde-kanni (*கொண்டே கன்னி*)

⇧: anuppu (*அனுப்பு*)

450 ## 7. M77 Line 1095-100101

NFM font equivalent rendering:

Ʊ◉🡓)𝕏
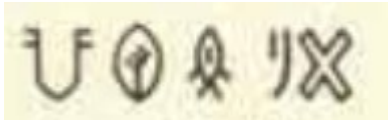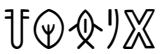
Cross-roads countryman sends cart to velappa town
455 *நால்வழியார் வண்டி வேலப்ப ஊர்(க்கு)*

The break-up steps:
)𝕏: nal-vaṟi (*நால்வழியில்*)

🡓: kāl (*கால்*)

Ʊ◉: velappa-ur (*வேலப்ப ஊர்*)

460 ## Pluripotency

The fish sign-59 🡓 kanni takes the values of boat, craft, vehicle, bullock cart in these cases. We have also observed that in some other case:

🡓 ⋈ ⫯ |

465   that the sign-59 ⚵ `kanni` takes the value of "trapper" or "trapping".

From these readings we also obtained:

```
ampu ≈ anuppu ≈ ambi
kondā ≈ konda
```

The syllables not only took different semantic values from the standalone values but they also took
470   a deformed phonemic values, a key aspect of Indus writing system that enables pluripotency in both
form and content in order increase coverage with only a few signs, thus increasing literacy.

Further readings
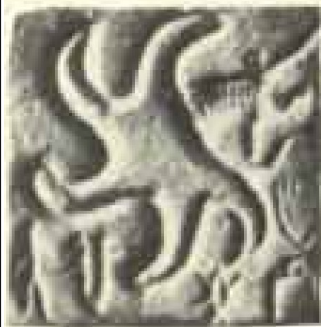
The above section considered just seven sentences in IVC text, but there are several thousand lines
of text in M77 [2] and we will be pursuing decipering them over time. Few pages have already been
475   deciphered from the lines of text available in Mahadevan's work [2]. The results will be reported in
online version tracking system, as and when we decipher them [7].

Graphics and text: a show and tell

In this document we decipher the text embedded along with illustrated scene in some of the IVC
tablets. We have selected only the ones that have certain dramatic element in it.

M77	Graphics	Glyphs	Syllables	Description	Tamil
Plate V - 98		ᵐᵐ⋈∪ ⫿⋈	tāḍu/tallu-utai	butt/crush-kick	தாடு/தல்லு உதை
Plate V - 103		‖ ⟨⋈⟪⟫ ⟨	ceru-koṭṭu-tāḷume-iru	stop-fight	செருக்கொட்டு தாளுமெ-இரு

M77	Graphics	Glyphs	Syllables	Description	Tamil
Plate V - 105		⇧⊕⸬⋎∥	iru-vilagu-ar-kanni-anuppu	prevent fighting by sending guard	இரு-விலக்கார்-கன்னி-அனுப்பு
Plate VI - 114		大ᚢ⊕⋈	mu-tāṟi-tai-koḷ-ūr-an	accept ancestoral power transfer	மூதாழிதை கொள் ஊரான்
Plate IV - 80		ᚢ⩗⊕✳⫘⋇	nal.vaṟi-yar-velan-kal-aru-ūr	Controller of cross-way Velan sending boat along the river in the town	நால்வழியார் வேலன் கல் ஆற்றுரூர்
Plate IV - 81		ᚢ⊕ᚥ⋈⋇	tan-taṟi-mu.ūr-kanni-ūr	Controller of many country transactions	தன்தாழி வேலப்ப மூவூர் கன்னியூர்
Plate III - 55		⊟⇧⊕✳⸬⊕	palla.kotta-ar-velan-kanni-anuppu-māṭi	Unity of seven (3+2+2) nation's Velan (controlling bureaucrat?): Elephant fort sending by	பல்லர் கோட்ட வேலன் கன்னி அனுப்பு மாடி/மாடு

M77	Graphics	Glyphs	Syllables	Description	Tamil
				vehicle to buffalo country	
Plate III - 54		大ᕕᏍ凸ᕟᏍᐩ	anjih.an- ūr-ar-mēl-konda-ūr-an	Five-cross-way multi-storeyed rest-house for travellors	அஞ்சியன் ஊரார் மேல் கொண்ட ஊரான்
Plate III - 57		ᕟᐟ	mu-puli(malai)-velan-eṛuvanji	Three-mountain tiger country excellent rest-house for hunters	முப்புலி வேலன் எழுவஞ்சி
Plate III - 50		ᕕ⼈ᐟᏍᗅᗅ	muvan-eṛuvanji-yar-ēr-ūr	Rhino country seal: Three-mountain rest-house to tiller's land	வலன் மூவன் வஞ்சியார்: ஏர் ஊர்
Plate III - 51		ᕕᐟᗅ⊛	palla-ar-māṭṭu-vel-ūr	Markhor country seal: Elephant country loads to hunter's town	பல்லர் மாட்டு வேலூர்

M77	Graphics	Glyphs	Syllables	Description	Tamil
Plate I - 18		೮‖൜⌘▫◇	koṭa-ar-konda-para-iru-ūr	Elephant country (food): Cattle herder sending by bullock to messenger's town	கோட்டார்: கொண்ட பறையர் ஊர்
Line 1093		⌘ ೮☺೮ ೮೮	konda ūr-taṟupu-ūr velūr-ūr	Gathering of buffalo townsmen at Velūr town	கொண்ட ஊர் தறுப்பூர் வேலூர் ஊர்

Major countries depicted by animals in seals

This is another major category that is directly indicated by animals.

Plate III -55 [2]

Here we can see five major countries indicated branching from two unicorn motifs and here with two of them further branching into two subcategories.

The seal on the right is either calling for (or celebrating) bartering between five countries:

೮‖൜ (para-ar-ūr, பறையரூர்)

calling for five nations to join in the barter system

ॼॼॼॼॼ

(cērukoḷ, சேர்ந்துகொள்)

The animals that seem to indicate the five nations [4] in the seals are:

Markhor/Gaur (bison) ◇, Buffalo ⊞, Elephant ⊗, Rhino ? and Tiger ⌛.

Although all the skills and specialised skill centers (vanjih, ⸝) are all distributed all over the towns and villages of all countries, in triple mountain tiger country (Afghanistan?) there seems to be preponderance of hunters, animal trappers and honey collectors.

A brief summary of the of the IVC writing system

500 The IVC system can be considered as a resolution of the contradiction arising between pure ideographic and pure syllabic system of writing. We were able to associate unique syllabic value to every sign. Although the ideographic system allows easy understanding of the base signs through a Dravidian root-word association, they also create a complex plethora of signs for the IVC writer to
505 recognize and use. In order to reduce the number of signs needed, a pure syllable-based number system seems to have been used, which is affixed/prefixed/welded to the base sign to produce aglutination of word-pieces. The core consonant backbone of the base is maintained in the aglutination process, but the affixes may retain only the front/middle/tail syllable, depending on whether it is affixed/infixed/prefixed, respectively. Although each sign signifes a syllable and not a
510 concept or idea, an ideographic undercurrect remains strong throughout the IVC writing system, creating certain stability of the semantics of the writing system. It is also observed that certain amount of arbitrariness is allowed during the aglutination process: deletion, modification or addition of vowels/glides. Glides are soft consonants that are added as binders for smooth phonetic transition between hard consonants. For proper understanding of practical Tamil grammar as it is
515 spoken now one can consult Harold F. Schiffman [8], but one must not apply these grammar rules blindly to the IVC writing system, as 5000 years separate the present Dravidian languages and the IVC languages.

Overlap with previous work

No work germinates on it's own; it usually germinates on a fertile ground laid down by others.
520 There were many conjectures on this Indus writing system by Asko Parbola, Iravadham Mahadevan and Brian Wells. I will briefly outline some of them pointing out overlaps and differences. It all started with the interpretation for fish sign as "mīn" by father Heras in 1930s [9]. This was reiterated with caution by Iravadham Mahadevan [10]. If we look at the frequency of the consonants in Tamil (both modern and old), the one that comes on top is "ka" and not "ma" or "mi". We know
525 that the fish sign is the most frequent in Indus script, so the obvious Turing's not so enigmatic result is that the fish sign must start with "ka" and we found "kanni" is probably more feasible. However, our result is independent of it and was inspired by M.V.Bhaskar's interpretation (personal communication) that the "Garial" (the river crocodile) is synonymous with fish and was probably trained and used as a boat. My own personal exposure to local customs also revealed that "kanni" is
530 a term used commonly in earlier times for boat or any vehicle. This was probably dropped later on in Tamil literature. The same however continues in Indo-European tradition that associates feminine gender to even a modern vehicle like train inflecting verb appropriately.

There were many interpretations by Asko Parbola and Mahadevan [11] on the M77 sign-342 ᖈ, including "-an". MVB was quite critical of this being male-centric, an apt criticism, as he found no
535 preponderance of male domination in IVC art. The interpretation of sign-1 ⼂ as "-an" has also been proposed by Bryan Wells [3] and then MVB's criticism can be cleverly overcome by stating that "-an/-al" could have been sex-neutral term in those days and associating "-al" with feminine gender could have been a later invention by the male-dominant society (especially as "-al" has connotation

with darkness and evil). On other proposals of Iravadham Mahadevan and Bryan Wells's on numbers as being semantically numbers, we found no parallels in our interpretations. In fact, the numbers are probably the only signs that almost never reflected their standalone ideographic value. This was indeed quite suprising for us, as we found almost no evidence for this. MVB has been quite radical in this interpretation, proposing that almost a new syllabic system can be conjured-up using just the numbers alone.

Yuri Knorozov [12] has also done extensive study of the IVC writing system and he has correctly identified numbers as syllables, with sign-86 | identified as "or", ‖ as "iru", ‖‖ as "mu", ‖‖‖ as "nal", ‖‖‖‖ as "ai". This is exactly as what we have deciphered here, although we consider sign-86 | as "mutal" and not "or".

Bryan Wells's work also proposes other possibilities like sign-358 ⱱ being closely related to the Hare's ears and so proposing the syllable "ce" from "cevian". The author is in full agreement with this proposal and in fact, both this and sign-76 🦗 also evokes the same "ce" syllables. In the IVC context of bronze-age, these have semantic connotations to "cembu" (bronze). Bryan Wells also proposed "kō" for sign-261 ◇ and "kōṭa" for sign-267 ◇. We are fully in agreement with these readings.

Ansumali Mukhopadhyay [13] studied the word for teeth, "`palla`" and it's relationship to the ivory trade. The sign-391 ⊗ is here deciphered as "`palla`", the elephant, an important sign in the IVC, especially in relationship to the ivory trade. There could have been many more proposals that may have some overlap with our interpretations here. We would be glad to include them in our document as soon as we are made aware of them.

Farmer et al. [14] criticism that the average number of signs in a line are two short (on the average of between 4 and 5 signs) for any meaningful orchestration of a writing system is quite correct. However, our decipherment points out that these lines of text are mostly **from/to** addresses with mode of transport indicated through fish and arrow signs in-between the **from** and **to** addresses. Sometimes the mode of transport is left out (or is implied) and the same could be true of the **to** address, which probably is implied from the context. There are also very short lines heaping praise on towns and their workers. In any case, writing in crisp and short messages is a tradition that has continued for a long-time in Dravidian tradition, as established in Thirukkural, which is taught even now in schools of Tamilnadu.

Conclusions

First important study of the Dravidian family of languages was by Caldwell [15] in 1886. Recent studies indicate that the temporal origin of proto-Dravidian to be around 2500 BCE [16, 17], so it can be discerned that the Indus script could have been a major epicenter for the formation of the identity of Dravidian language family. We can even go ahead and conjecture that some aspects of Dravidian linguistic structure could have been a result of remoulding of languages of the Indus Valley Civilization into an aglutinative reformulation as contrained and evolved by the Indus script. After the gradual decay of IVC, with southern migration of the population, the language could have radiated into the many branches of Dravidian family [16]. A detailed study of the decipherment and it's relationship to Dravidian morphology could provide further clarity on this feasibility.

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Conflict of interest

Author would like to state that there is no conflict of interest in this paper.

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